

CHAPTER 1

Introduction

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Introduction

This book is designed primarily for the busy emergency physician in search of a practical guide to occupational medicine in the emergency department. Occupational physicians should also find in it a useful perspective on the approach to occupational medicine in a venue not traditionally considered an occupational-medicine setting. Hopefully, this text will also throw light onto the heretofore-little-illuminated interface between two crucial specialties.

Emergency medicine, occupational medicine, and their intersection

In the 1970s and 1980s, emergency physicians proposed several definitions of their unique role in clinical medicine [1–3]. A special document prepared by the American College of Emergency Physicians (ACEP) Practice Management Committee and approved by the ACEP Board of Directors defined emergency medicine as encompassing “the immediate decision making and action necessary to prevent death or any further disability for patients in health crises,” described the specialty as “patient-demanded, broadly available, and continuously accessible care by physicians trained to engage in

the recognition, stabilization, evaluation, treatment, and disposition of patients in response to acute illness and injury,” and characterized the relevant patient population as unrestricted and presenting “with a full spectrum of episodic, undifferentiated physical and behavioral conditions [4].” The last of six chief duties of an emergency physician as elaborated by this statement was “(6) the provision of continuing occupational medical services, including illness and injury prevention and management, and patient rehabilitation [4].” Subsequent definitions of the specialty [5–9] have continued to emphasize these principles, including the role of emergency providers in the provision of occupational medicine. The most recent ACEP policy statement emphasizes the triple role of emergency physicians in (a) providing “rapid assessment and treatment of any patient with a medical emergency;” (b) “initial assessment and care of any medical condition that a patient believes requires urgent attention;” and (c) “medical care for individuals who lack access to other avenues of care [9].”

Occupational medicine has similarly seen a progression of definitions over the years [10]. One useful perspective is to consider occupational medicine “that practice of medicine which (i) focuses on enhancing and maintaining the health of people at work, ensuring they operate safely considering any health issues they may have; and (ii) contributes to organizational effectiveness of enterprises by providing expert medical advice to management [11].” Strictly speaking, occupational medicine, often grouped with environmental medicine as “occupational and environmental medicine,” refers to the medical care, by properly trained physicians, of patients with health or safety

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problems arising from the workplace or from the environment. It is the medical subset of the broader category of occupational and environmental *health*, which marshals the resources of a variety of health professionals (including not only occupational physicians but also occupational-health nurses, occupational therapists, industrial hygienists, etc.) [12]. The currently posted position statement of the American College of Occupational and Environment Medicine (ACOEM) on the scope of occupational and environmental health programs and practice [13] identifies the elements outlined in Table 1.1 as "*essential components*" [italics in original] of occupational-health practice. Emergency physicians may also be called upon to perform many of these stated functions; for example, although the initial evaluation for personal protective equipment (PPE) does not usually occur in the emergency department, an emergency physician may need to know the impact of PPE upon the medical and safety status of a patient and may be asked to render an opinion concerning the adequacy of PPE or when and to what extent a patient can return to work with such equipment. In Table 1.1, further elaboration is provided in italic type for those functions (indicated in boldface type) that an emergency physician might *most frequently* be called upon to perform in an emergency department.

Emergency medicine and occupational [13] medicine thus overlap in a number of areas and not only in the ones outlined in Table 1.1. Any emergency department patient who is either currently employed or who has a history of employment may have a work-related condition that can affect his or her current medical condition. Several kinds of hazards or agents encountered in the workplace can be responsible, including chemical, biological, physical, ergonomic, and psychological stressors. Although the specialized role of emergency medicine in recognizing, evaluating, and treating, say, a toxic exposure, is different from the role of occupational medicine [14, 15], both specialties are often involved, sometimes unwittingly; and both kinds of specialists need to appreciate their specific roles and responsibilities, the complimentary expertise and skills of the other, and the importance of communicating and using an interdisciplinary, team

approach [16–24]. In addition, health care providers in the emergency department are themselves subject to occupational hazards to include bloodborne pathogens (human immunodeficiency virus [HIV] and hepatitis B and C [and possibly G] viruses), tuberculosis, latex allergy, exposure to nitrous oxide, workplace violence, rotating shift work, emotional stress, and disaster-related hazards and need to appreciate the occupational-health aspects of their own job functions [25–35].

A separate but related incentive for emergency physicians to learn about occupational medicine is the changing standard of care in the United States relating to the knowledge and skills required of emergency physicians encountering work-related issues. Failure to recognize the work-relatedness of a disease or injury presenting in an emergency department may render an emergency physician legally liable for damages. Although it is difficult to anticipate how courts will rule in a given case, standards of care are evolving and becoming stricter. Familiarity with occupational issues and the ability to recognize and manage (including properly referring as appropriate) conditions caused or exacerbated by the workplace or the environment are already required under one of the core functions of emergency medicine and may soon be expected at a much higher level [36, 37].

Emergency medicine is not only patient-demanded (i.e., related to the provision of care to patients who themselves prospectively determine what constitutes for them an emergency) but also centered on individual patients. Occupational medicine is sometimes contrasted with emergency medicine as representing "the opposite ends of a medical spectrum [12]," in that occupational medicine is often perceived as emphasizing the workforce rather than the individual worker. For example, in a 1985 position statement, the ACEP asserted that "the occupational medicine specialist comes from a preventive medicine background with training that emphasizes epidemiology, biostatistics, and toxicology. The emergency-medicine specialist comes from an acute-care background with training that emphasizes emergency illness and injury recognition and treatment [12]." This perception of a nonclinical emphasis of occupational medicine is,

Table 1.1 Essential components of occupational health practice from the position statement of the American College of Occupational and Environmental Medicine on the scope of occupational and environmental health programs and practice [13].

LEADERSHIP AND MANAGEMENT

Organization and Administration
 Organizational Commitment, Innovation and Change Management
 Health Information Systems
 Program Evaluation and Quality Improvement
 Privacy, Confidentiality, and Health Records Management
 Systematic Research, Statistics and Epidemiology

HEALTHY WORKERS

Health Evaluation of Workers

- Pre-assignment/pre-placement
- Medical monitoring
- Post-illness or injury, fitness-for-duty evaluations and independent medical examinations

The health status of the worker should be reevaluated following prolonged absence from work due to illness or injury, whenever there are concerns of ability to perform all job tasks, and for globally assessing worker's allegations and claims. The goal is to assure that the individual has sufficiently recovered from the illness or injury to perform the job without undue risk of adverse health or safety effects to the individual or to others. It is important for occupational health professionals to be involved in return-to-work planning, as they can help determine if workers are able to return to restricted or full time work, on a temporary or permanent basis.

- Termination of assignment

Occupational Injury or Illness Management

Occupational and environmental injuries and illnesses should be diagnosed and treated promptly. Occupational and environmental physicians are best qualified to diagnose occupational illnesses and injuries because of their knowledge of the workplace and environment. The occupational health physician should objectively resolve issues about occupational causation of illness, be knowledgeable regarding available rehabilitation programs and facilities, and interact with program administrators as appropriate to facilitate post illness or injury return to work based on familiarity with the worksite and input from supervisory/management personnel.

Non-occupational Injury and Health Management

The occupational health physician can design a comprehensive program that provides treatment for emergency conditions, including emotional crises that occur among workers while at work. This treatment may only be palliative and to prevent loss of life and limb or, where personnel and facilities are available, may be more definitive. Many employers are moving toward an employee health model of expanding onsite or near-site clinical services by using physician and/or nurse practitioner or physician assistant personnel with appropriate physician oversight to render diagnostic, treatment, and chronic disease maintenance, and preventive medicine. These services are convenient for the worker and enhance productivity in the work place by helping to reduce time away from the work site for minor injury or illness. Care at the workplace should be consistent with local standards of patient-physician relationships.

Traveler Health and Infection Control

Mental and Behavioral Health/Misuse of Substances

Medical Screening and Preventive Services

HEALTHY ENVIRONMENT

Workplace Health Hazard Evaluations, Inspection and Abatement

Education Regarding Environmental Hazards

Occupational and environmental health (OEH) programs identify and educate workers about potential hazards at the worksite and in the community. Every worker should know the potential hazards involved in each job to which he or she is likely to be assigned. The OSHA Hazard Communication Standard ("right-to-know") stresses the importance of worker knowledge of chemical usage.

Personal Protective Equipment

(Continued)

Table 1.1 (Continued)

Toxicologic Assessment

OEH programs should include procedures to incorporate advice on the nature, adequacy, and significance of toxicological test data pertinent to the workplace. Toxicological assessments include advice on chemical substances that have not had adequate toxicological testing. Where adequate data does not exist, the occupational and environmental medicine physician should recommend appropriate medical monitoring and testing practices. Occupational and environmental medicine physicians should recommend protection and monitoring of workers in keeping with data available or until appropriate data are received.

Environmental Protection Programs

Environmental protection programs should support a scientifically based process to evaluate and prioritize the potential public health and environmental risks posed by exposure to various hazards. The goal is to identify whether any specific chemicals or other hazards generally pose an unacceptable risk and the conditions and uses under which they pose such risks, using a risk management process that follows a preventive health model and which employs a full range of pollution prevention options (e.g., substitution, source reduction, recycle and reuse, and treatment).

Emergency Preparedness, Continuity Planning, and Disruption Prevention

Occupational health programs should have a plan for managing health-related aspects of disasters, including terrorism and public health hazards. This is important for the safety and welfare of the employees and community, as well as for continuity planning and prevention of disruption of corporate initiatives. Since community facilities and health and safety personnel are an essential part of dealing with an emergency at the work place, such planning should be done in conjunction with the local community (Title III – Superfund Amendments and Reauthorization Act [SARA]). Under Title III, companies covered under the Hazard Communication Standard are required to make their chemical inventories known to emergency response groups of [the] local community.

Healthy Organization**Absence and Disability Management**

Disability management programs assess reasons for workers' poor performance or absence from work due to illness or injury and determine when the individual is well enough to return to work safely. Closely related is the primary role of evaluating illness conditions that render work unsafe and require job modifications. This role is expanding to identifying individuals and worker populations who are at increased risk of poor performance because of health issues and finding positive means to enhance health and productivity in the workforce and decrease absenteeism.

Health Benefits Management**Integrated Health and Productivity Management**

however, misplaced. Occupational medicine is officially a subspecialty of preventive medicine, which does indeed emphasize the health of populations. What differentiates occupational and environmental medicine from general preventive medicine and public health is not just the etiology of the medical problems (arising from the workplace or from the environment) but also the responsibility of the occupational physician for clinical evaluation of individual workers and other patients in addition to a population-based concern for the workforce and those exposed to given environmental hazards. An occupational physician cannot afford to ignore either the clinical care of the individual patient or the possibility of

similar conditions in a larger population and in that sense represents a bridge between epidemiologically oriented general preventive medicine or public health and patient-centered emergency medicine [38]. Emergency physicians dealing with occupational or environmental issues in the emergency department similarly need to understand that they have a responsibility not only to the individual patient but also to a larger population in which heightened risk of disease or injury may go unrecognized and unaddressed if the examining emergency physician fails to recognize the connection between the patient in the emergency department and the broader population [6].

Emergency physicians usually practice in an emergency department setting, although they may also supervise prehospital emergency care. Occupational medicine, in contrast, is practiced in a wide variety of settings, from workplace clinics to freestanding offices [39]. Occupational physicians rarely consider emergency departments as settings for occupational-medicine care apart from emergency treatment of occupational injuries, yet any emergency department patient with a current or prior job may have a work-related overlay [40]. Occupational medicine in the emergency department essentially becomes a subspecialty of emergency medicine in this setting.

What, then, constitutes the overlap between emergency medicine and occupational medicine? In its 1986 position statement "Definition of Emergency Medicine and the Emergency Physician," the ACEP stated, "The emergency physician with additional qualifications and/or special competencies frequently may engage in . . . the provision of continuing occupational medical services, including illness and injury prevention and management, and patient rehabilitation [12]." It further defined the intersection of emergency and occupational medicine as "industrial medicine," concerned with the traditional occupational-medicine elements of "health evaluations of employees, diagnosis and treatment of occupational injuries (including rehabilitation), emergency treatment of nonoccupational injuries or illnesses, assisting management in providing a safe and healthful working environment, maintenance of occupational health records, immunization against possible occupational infections, and assisting in interpretation of health regulations [4]." Who *should* see a patient with one or more of these concerns? The ACEP opines, "When the care of workers requires in-depth preventive medicine skills (e.g., an epidemiological study of "tight building syndrome"), the occupational physician is the preferred provider. When the care of workers requires in-depth emergency-medicine skills (e.g., resuscitating a worker with acute poisoning), the emergency physician is the preferred provider [12]." Who *does* see such a patient? Conditions in the real world are rarely so clear-cut. Patients whose current or past work conditions make them vulnerable

to a work-related injury or illness frequently decide to visit an emergency department for their medical care, care that may require an investigation into occupational issues traditionally left to the occupational physician. Immediate action may be required pending evaluation by an occupational physician. Whether or not a given situation falls under the rubric of "industrial medicine" (a term that has since fallen out of favor, since it implies a narrow relationship with workers in heavy industry) or an identifiable injury, emergency physicians must actively look for workplace effects on every patient who comes to the emergency department. Often, the emergency physician will be the only acute-care provider positioned to recognize and manage the work-related aspects of an injury or illness.

In a 1999 information paper, the Emergency Medicine Practice Committee of the ACEP recommended the following:

"The emergency physician providing occupational and environmental medical services must be prepared in the following areas:

- 1 Environmental health
- 2 Toxicology
- 3 Women's health
 - Infertility issues
 - Spontaneous abortion
 - Teratogeneses
 - Mutogeneses [*sic*]
- 4 Confidentiality rules
 - Federal
 - State
 - Local
- 5 State industrial commission regulations
- 6 Drug testing regulations
- 7 Medical review officer requirements (DOT, etc. Alcohol and Drug testing review)
- 8 EMS response to industry related injury and environmental contamination [41]."

The epidemiology of occupational-medicine issues in the emergency department

All data collection systems for occupational disorders have limitations, as do data sources for estimating

diseases related to the environment [42]. Each year, employers in the United States consult their Occupational Health and Safety Administration (OSHA) logs and supplementary materials to respond to the annual U.S. Bureau of Labor and Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII). This survey generates yearly estimates of numbers and rates of new workplace injuries and illnesses. In 1998, the BLS estimated that 5.9 million occupational injuries and illnesses were treated in emergency departments in the United States; this figure was significantly lower than estimates from other surveillance systems [43, 44]. Concerns that the SOII data represent serious undercounting center on the following four dimensions:

- 1 Failure to count occupational illnesses that have a long latent period;
- 2 Failure to count injuries and illnesses from out-of-scope workers (e.g., workers on small farms);
- 3 Failure to count injuries and illnesses reported in worker's compensation and other systems;
- 4 Failure to count injuries and illness not reported in any system [45].

The National Institute for Occupational Safety and Health (NIOSH) presents data from SOII and other systems, to include the National Center for Health Statistics (NCHS), the Census of Fatal Occupational Injuries (CFOI), the National Traumatic Occupational Fatalities (NTOF) Surveillance System, the National Electronic Injury Surveillance System (NEISS), the National Occupational Mortality Surveillance System (NOMS), the Sentinel Event Notification System for Occupational Risk (SENSOR), the Third National Health and Nutrition Examination Survey (NHANES III), the Coal Workers' X-Ray Surveillance Program (CWXP), the Adult Blood Lead Epidemiology and Surveillance Program (ABLES), the National Surveillance System for Hospital Health Care Workers (NaSH), and several infectious-disease surveillance systems [46].

The NIOSH Publication No. 2000-127, "Worker Health Chartbook, 2000," reports NTOF data indicating that from 1980 through 1995, 93,929 civilians in the United States suffered *fatal occupational injuries*, for an average annual fatality rate of 5.3 deaths per 100,000 workers. (BLS fatality counts for

the same period are about 1,000 deaths lower.) The leading causes of work-related death were motor vehicle incidents, machine-related injuries, homicides, falls, and electrocutions, with most deaths occurring in the construction, transportation-and-public-utilities, and manufacturing sectors [46]. Data from the National Health Interview Survey (NHIS) from 1997 through 1999 reveal that during this time frame, 19.4 million American adults of working age suffered injuries that were medically treated. Of these, 5.5 million (29%) occurred at work. Among workers, 38% of injuries happened at work; this estimate rose to 54% for working men 55–64 years of age. NHIS estimates were 1.4 times higher than BLS estimates for private industry [47].

Fatal occupational illnesses are more difficult than fatal injuries to link to occupational exposures, partly because the pathological processes and clinical presentations involved may be the same for occupational and nonoccupational diseases, partly because of the already mentioned problem of extremely long latent periods for these illnesses and partly because of the presence of confounders operating over these long periods. Even though 16–17% of lung cancer cases in men are thought to be work-related, NIOSH excludes lung cancer from its analyses of fatal workplace illnesses. Pneumoconioses, malignant pleural neoplasms (for the most part, mesotheliomas), and hypersensitivity pneumonitis are among the more frequent work-related causes of fatal illnesses in the United States. It has been estimated that 390,000 new cases of occupational illnesses occur each year and that 100,000 deaths annually are caused by occupational disease [48].

Data on *nonfatal occupational injuries* are collected by SOII, NEISS, and the National Hospital Ambulatory Medical Care Survey (NHAMCS) [49–53]. NHAMCS reported 2,097 worker's compensation visits and 3,376 work-related visits to U.S. emergency departments in 2006; the work-related visits represented 2.8% of the total visits [54]. NIOSH reports that occupational injuries treated in emergency departments are, not surprisingly, usually more urgent or severe than those treated solely at the workplace or in offices. According to NEISS, 3.6 million nonfatal work-related injuries

were treated in U.S. emergency departments in 1998, involving mostly the hands and fingers (30% of the total) and accounting for 3.4 injuries per 100 full-time male workers (the rate for female workers was 2 injuries per 100 full-time workers). Lacerations and punctures (26%), sprains and strains (25%), and contusions, abrasions, and hematomas (19%) constituted the most common types of injuries [46].

In 1997, SOII recorded 429,800 new *nonfatal occupational illnesses*, most of which, because of the definitions used, are repeated-trauma disorders such as carpal-tunnel syndrome. Because these conditions result from minor, usually subclinical, trauma incurred over an appreciable period of time, they are not considered injuries for reporting purposes. Noise-induced hearing loss, skin disorders (mostly contact dermatitis), dust diseases of the lungs (e.g., coal-workers' pneumoconiosis and silicosis), toxic inhalations (accounting for 20,300 cases in 1997, or 5% of workplace illnesses), and asthma and chronic obstructive pulmonary disease (recorded in NHANES III) are common nontraumatic occupational illnesses [46]. The 5,100 cases of occupational poisoning recorded by SOII in 1997 represented 1% of all nonfatal occupational illnesses and included exposures to heavy metals (including lead), carbon monoxide, hydrogen sulfide, organic solvents, and pesticides as well as a large number of other substances. Most occupational infections between 1995 and 1999 occurred in nurses (43%) and physicians (29%), and most were needlestick-related. Nonfatal occupational illnesses caused by physical agents included heatstroke, sunstroke, heat exhaustion, freezing, frostbite, and effects from ionizing and nonionizing radiation [46].

A number of data sources track emergency department visits [55]. The Work-Related Injury Statistics Query System (Work-RISQS) from NIOSH provides user-personalized access to data on occupational conditions treated in emergency departments. It is available online at <http://www2.cdc.gov/risqs> and can be used to generate data conforming to user-generated parameters of time, age, and sex [56]. Currently, data are available for 1998, 1999, and 2000. The Web site also contains links to occupational-injury articles from the

medical literature as well as links to major sources of statistical data on work-related injuries and illnesses. Work-RISQS reports an estimated 4,101,200 nonfatal occupational injuries and illnesses treated in U.S. hospital emergency departments in 2000, for a rate of 3.1 incidents per full-time employee. According to NEISS, three-fourths of all emergency department-treated injuries in 1998 occurred in workers 20–44 years old [43]. Work-RISQS provides similar data for 1998 through 2000.

Most of the other data on occupational conditions seen in emergency departments focuses on specific occupations or specific injuries, although the feasibility of routine data collection on such injuries remains debatable [57]. For example, a surveillance study of emergency department admissions for nine rural hospitals demonstrated that 189 of the 1,843 injury visits of all employed patients with known occupations were from construction workers and that the injury rate among these workers was more than 2.5 times that of all other workers [58]. In a similar study of rural emergency departments, work-related injuries accounted for 12.5% of all injuries. Most patients (91%) were treated and released. The average charge for those treated and released was \$273; the average charge for those hospitalized was \$10,910, with a high of \$62,622 [59]. Henneberger et al. reported NEISS data showing that in 1995 and 1996, 44,423 cases of occupational inhalation were treated in U.S. emergency departments [60]. A useful tabulation of emergency department visits for work-related injuries and illnesses in Massachusetts from 2001 to 2002 appeared in 2007 [61]. The Centers for Disease Control and Prevention (CDC) periodically publishes in the Morbidity and Mortality Weekly Report (MMWR) data for nonfatal occupational injuries treated in hospital emergency departments. For 1996, data derived from NHAMCS estimated that 4.2 million occupational injuries were treated in hospital emergency departments that year—12% of all injuries treated in the emergency departments [62]. These MMWR reports usually subsequently appear in the *Journal of the American Medical Association (JAMA)* [63]. Data from 2004 were reported in the MMWR in 2007 [64]. Young people who present with injuries in rural emergency

departments are often not questioned about unsafe working conditions that may have contributed to their injuries and that, uncorrected, may contribute to future injuries; NEISS collects data on such injuries seen in emergency departments [65]. Young people in general may not be questioned about work issues, although work-related injuries, especially from agriculture and construction, are not uncommon in this population [66–68]. Data are available on other agricultural injuries and illnesses treated in an emergency medicine setting [69–74]. Unusual occupational injuries for which emergency department statistics are available include ladder injuries [75, 76] and nail-gun injuries [77, 78].

Occupational-medicine challenges for the emergency physician

Emergency and occupational physicians are trained under different regimens and board-certified by different organizations (the American Board of Emergency Medicine [ABEM] and the American Board of Preventive Medicine [ABPM], respectively). Van Dyke in 1987 recognized that the responsibility of the ACEP was not to help emergency physicians develop occupational-health skills falling outside the intersection of emergency and occupational medicine [12]; instead, he sought to highlight the fact that most emergency providers do not think of workplace issues except when treating acute industrial injuries [79] and to emphasize the need to correct this deficiency. Conversely, in the 1980s, only about 30% of the practice of a typical occupational physician was devoted to acute injuries [79]. Van Dyke wrote, “Emergency physicians are as well trained as anyone to handle acute occupational injuries, but where can they get the additional training to expand their expertise in occupational medicine [79]?” Although it can be argued that additional training would be useful even in the area of the occupational ramifications of workplace injuries, the call for programs to increase the knowledge base and skill set of emergency physicians was an appropriate one and was initially applauded [80]. Unfortunately, over the past 25 years, neither the ACEP nor other

organized emergency medicine groups have done very much to develop the interface between occupational medicine and emergency medicine. Recently, Web-based initiatives have arisen, but these programs are not usually tailored to the specific needs of emergency physicians [81].

Undoubtedly the most serious impediment to proper recognition and management of occupational disorders, particularly the less obvious occupational injuries, in the emergency department is the failure to ask about the current and past occupations and job duties of patients [82–86]. Even unemployed patients may have a past work history that may impinge on their current medical conditions. Workplace factors are discussed in only 21% of physician–patient encounters even though 20% of patients in one study reported workplace causation, 15% reported exacerbation of their condition by work, and 15% complained that their condition made work more difficult [16]. A study of 2,050 medical charts found that although gender and age histories appeared in 99% of the charts, an occupational history was present in only 27.8% [87]. Even when the current general occupation of a patient appears on a chart, it is distinctly rare to find a specific job description or a list of previous jobs. Cancer patients represent a group with long-latency disease often associated with employment, often in the remote past [88–90]. In an investigation of patients with transitional cell carcinoma of the bladder, 12% of all charts had no mention of occupational history or of occupations that might have been a significant factor in the etiology of the bladder cancer [91]. Both benign and malignant asbestos-related diseases may arise decades after significant exposure; their relationship to workplace or environmental exposures may be missed if a thorough occupational history is not performed [92]. The consequences of a missing or inadequate occupational history, in addition to legal liability for the emergency physician, include the failure to detect an occupational etiology that may be relevant for management of the individual patient and the failure to detect a correctable workplace or environmental exposure that can affect other individuals in the same setting. Effects on a patient’s return to work or on worker’s compensation or other legal issues may be

significant [93, 94]. Back pain is commonly seen in the emergency department and is frequently related to work [95], as are eye injuries [96]. Less commonly recognized as having a potential workplace component are reproductive disorders [97–103], dermatitis [104], and medical problems in those with specialized occupations such as the performing arts [105–108]. Taking an effective occupational history in the emergency department is hindered not only by overcrowding and time constraints [109] but also by the observation that there is an extremely low correlation between physician and worker judgment of the work-relatedness of health problems [110]. Many versions of occupational and environmental questionnaires exist [111–116], but questionnaires have drawbacks as well as advantages. The most important advice to an emergency physician with respect to occupational issues in the emergency department is to inquire about the patient's occupational history and to maintain a high index of suspicion for work-relatedness of any injury or illness encountered.

References

- [Use of the designation "emergency physician." Definition of occupational duties by Regional General Medical Councils]. *Med Monatsschr* 1972;26:241–243.
- Definition of emergency medicine. *Ann Emerg Med* 1981;10:385–388.
- Mickel HS. Emergency medicine: definition and direction. *Am J Emerg Med* 1984;2:172–174.
- American College of Emergency Physicians. Definition of emergency medicine and the emergency physician. *Ann Emerg Med* 1986;15:1240–1241.
- American College of Emergency Physicians. Definition of emergency medicine. *Ann Emerg Med* 1994;24:553–554.
- Bernstein E, Goldfrank LR, Kellerman AL, et al. A public health approach to emergency medicine: preparing for the twenty-first century. *Acad Emerg Med* 1994;1:277–286.
- Foldes SS, Fischer LR, Kaminsky K. What is an emergency? The judgments of two physicians. *Ann Emerg Med* 1994;23:833–840.
- Schneider SM, Hamilton GC, Moyer P, Stapczynski JS. Definition of emergency medicine. *Acad Emerg Med* 1998;5:348–351.
- American College of Emergency Physicians. Definition of emergency medicine. *Ann Emerg Med* 2008;52:189–190.
- Emmett EA. What is the strategic value of occupational and environmental medicine? Observations from the United States and Australia. *J Occup Environ Med* 1996;38:1124–1134.
- Nicholson PJ. Occupational medicine: new world, new definition. *Occup Med (Lond)* 2001;51:423–424.
- American College of Emergency Physicians. Report on the role of the emergency physician in occupational medicine. *Ann Emerg Med* 1988;17:1112–1114.
- American College of Occupational and Environmental Medicine (ACOEM) Scope of Occupational and Environmental Health Programs and Practice; 2008. Available from: <http://www.acoem.org/guidelines.aspx?id=736>. Accessed March 29, 2010.
- Cunningham G. Lead—toxicology and assessment in general practice. *Aust Fam Physician* 2007;36:1011–1013.
- Dantin Gallego J. [Theory and medical health practice concerning occupational diseases, with reference to historical and present lead poisoning. Critical comments]. *An R Acad Nac Med (Madr)* 1987;104:13–51.
- Harber P, Bublik M, Steimberg C, Wallace J, Merz B. Occupational issues in episodic care populations. *Am J Ind Med* 2003;43:221–226.
- Burns R, Nichols LO, Martindale-Adams J, Grancy MJ. Interdisciplinary geriatric primary care evaluation and management: two-year outcomes. *J Am Geriatr Soc* 2000;48:8–13.
- Dyne PL, Strauss RW, Rinnert S. Systems-based practice: the sixth core competency. *Acad Emerg Med* 2002;9:1270–1277.
- American College of Emergency Physicians. Initial management of patients who present to the emergency department with a work-related injury or illness. *Ann Emerg Med* 1998;32:527–528.
- Albrecht G, Freeman S, Higginbotham N. Complexity and human health: the case for a transdisciplinary paradigm. *Cult Med Psychiatry* 1998;22:55–92.
- Belmar R. [Primary care. General principles and specific tasks]. *Enfoques Aten Prim* 1990;5:22–24.
- Blanke RV. Resources available for patient evaluation. *Clin Lab Med* 1984;4:499–506.
- Fernandez R, Kozlowski SW, Shapiro MJ, Salas E. Toward a definition of teamwork in emergency medicine. *Acad Emerg Med* 2008;15:1104–1112.
- Lerner EB, Fernandez AR, Shah MN. Do emergency medical services professionals think they should participate in disease prevention? *Prehosp Emerg Care* 2009;13:64–70.

- 25 Dorevitch S, Forst L. The occupational hazards of emergency physicians. *Am J Emerg Med* 2000;18:300-311.
- 26 Cone DC, McNamara RM. Injuries to emergency medicine residents on EMS rotations. *Prehosp Emerg Care* 1998;2:123-126.
- 27 Go GW, Baraff LJ, Schriger DL. Management guidelines for health care workers exposed to blood and body fluids. *Ann Emerg Med* 1991;20:1341-1350.
- 28 Gershon RR, Vlahov D, Kelen G, Conrad B, Murphy L. Review of accidents/injuries among emergency medical services workers in Baltimore, Maryland. *Prehosp Disaster Med* 1995;10:14-18.
- 29 Jagger J, Powers RD, Day JS, Detmer DE, Blackwell B, Pearson RD. Epidemiology and prevention of blood and body fluid exposures among emergency department staff. *J Emerg Med* 1994;12:753-765.
- 30 Moran GJ. Emergency department management of blood and body fluid exposures. *Ann Emerg Med* 2000;35:47-62.
- 31 Merchant RC, Becker BM, Mayer KH, Fuerch J, Schreck B. Emergency department blood or body fluid exposure evaluations and HIV postexposure prophylaxis usage. *Acad Emerg Med* 2003;10:1345-1353.
- 32 Merchant RC, Katzen JB, Mayer KH, Becker BM. Emergency department evaluations of non-percutaneous blood or body fluid exposures during cardiopulmonary resuscitation. *Prehosp Disaster Med* 2007;22:330-334.
- 33 Merchant RC, Nettleton JE, Mayer KH, Becker BM. Blood or body fluid exposures and HIV postexposure prophylaxis utilization among first responders. *Prehosp Emerg Care* 2009;13:6-13.
- 34 Oliveira AC, Lopes AC, Paiva MH. [Occupational accidents due to exposure to biological material in the multidisciplinary team of the emergency service]. *Rev Esc Enferm USP* 2009;43:677-683.
- 35 Reichard AA, Jackson LL. Occupational injuries among emergency responders. *Am J Ind Med* 2010;53:1-11.
- 36 Damme C. Diagnosing occupational disease: a new standard of care? *J Occup Med* 1978;20:251-254.
- 37 Hitchcock T. Evidence, expertise and the emergency physician: doctors should anticipate legal reform in their expert evidence. *Emerg Med (Fremantle)* 2001;13:104-109.
- 38 Rosenstock L, Landrigan PJ. Occupational health: the intersection between clinical medicine and public health. *Annu Rev Public Health* 1986;7:337-356.
- 39 de la Hoz RE, Parker JE. Occupational and environmental medicine in the United States. *Int Arch Occup Environ Health* 1998;71:155-161.
- 40 Goldbaum R. Occupational disease: the patient as worker. *Nurse Pract* 1981;6:8-11.
- 41 American College of Emergency Physicians (ACEP). The Role of Emergency Medicine in Occupational and Environmental Medicine; 1999. Available from: www.acep.org/WorkArea/DownloadAsset.aspx?id=8966. Accessed March 29, 2010.
- 42 Walker B Jr. Data sources for estimating environment-related diseases. *J Natl Med Assoc* 1984;76:257-261.
- 43 Jackson LL. Non-fatal occupational injuries and illnesses treated in hospital emergency departments in the United States. *Inj Prev* 2001;7(Suppl. 1):i21-i26.
- 44 Leigh JP, Marcin JP, Miller TR. An estimate of the U.S. Government's undercount of nonfatal occupational injuries. *J Occup Environ Med* 2004;46:10-18.
- 45 Ruser JW. Examining evidence on whether BLS undercounts workplace injuries and illnesses. *Mon Labor Rev* 2008;131:20-32.
- 46 National Institute for Occupational Safety and Health. Worker health chartbook, 2000. NIOSH Publication No. 2000-127. U.S. Dept. of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health: Cincinnati, OH. Available from: <http://www.cdc.gov/niosh/docs/2000-127/>. Accessed March 29, 2010.
- 47 Smith GS, Wellman HM, Sorock GS, et al. Injuries at work in the US adult population: contributions to the total injury burden. *Am J Public Health* 2005;95:1213-1219.
- 48 Felton JS. The occupational history: a neglected area in the clinical history. *J Fam Pract* 1980;11:33-39.
- 49 Hing E, Middleton K. National Hospital Ambulatory Medical Care Survey: 2001 outpatient department summary. *Adv Data* 2003;338:1-26.
- 50 Middleton K, Hing E. National Hospital Ambulatory Medical Care Survey: 2003 outpatient department summary. *Adv Data* 2005;366:1-36.
- 51 Middleton KR, Hing E. National Hospital Ambulatory Medical Care Survey: 2004 outpatient department summary. *Adv Data* 2006;373:1-27.
- 52 Middleton K, Hing E, Xu J. National Hospital Ambulatory Medical Care Survey: 2005 outpatient department summary. *Adv Data* 2007;389:1-34.
- 53 Binns HJ, Lanier D, Pace WD, et al. Describing primary care encounters: the Primary Care Network Survey and the National Ambulatory Medical Care Survey. *Ann Fam Med* 2007;5:39-47.
- 54 Hing E, Hall MJ, Xu J. National Hospital Ambulatory Medical Care Survey: 2006 outpatient department summary. *Natl Health Stat Report* 2008 August 6;4:1-31.
- 55 Owens PL, Barrett ML, Gibson TB, Andrews RM, Weinick RM, Mutter RL. Emergency department care

- in the United States: a profile of National Data Sources. *Ann Emerg Med* 2010;56:150–165.
- 56 Xiang H, Stallones L, Chen G, Smith GA. Work-related eye injuries treated in hospital emergency departments in the US. *Am J Ind Med* 2005;48:57–62.
 - 57 Stokes MA, Fox B, Staines C, Ozanne-Smith J. Feasibility of routine collection of injured worker occupational information in hospital emergency departments. *Inj Control Saf Promot* 2003;10:261–262.
 - 58 Zwerling C, Miller ER, Lynch CF, Torner J. Injuries among construction workers in rural Iowa: emergency department surveillance. *J Occup Environ Med* 1996;38:698–704.
 - 59 Williams JM, Higgins D, Furbie PM, Prescott JE. Work-related injuries in a rural emergency department population. *Acad Emerg Med* 1997;4:277–281.
 - 60 Henneberger PK, Metayer C, Layne LA, Althouse R. Nonfatal work-related inhalations: surveillance data from hospital emergency departments, 1995–1996. *Am J Ind Med* 2000;38:140–148.
 - 61 Massachusetts Department of Health. Emergency department visits for work-related injuries and illnesses in Massachusetts, 2001–2002. Massachusetts Department of Health. Technical Report OHSP-0701; 2007: 43 pp. Available from: http://www.mass.gov/Eeohhs2/docs/dph/occupational_health/work_related_emergency_visits_01_02.pdf. Accessed March 30, 2010.
 - 62 Surveillance for nonfatal occupational injuries treated in hospital emergency departments—United States, 1996. *MMWR Morb Mortal Wkly Rep* 1998;47:302–306.
 - 63 From the Centers for Disease Control and Prevention. Surveillance for nonfatal occupational injuries treated in hospital emergency departments—United States, 1996. *JAMA* 1998;279:1601–1602.
 - 64 Nonfatal occupational injuries and illnesses—United States, 2004. *MMWR Morb Mortal Wkly Rep* 2007;56:393–397.
 - 65 Youth agricultural work-related injuries treated in emergency departments—United States, October 1995–September 1997. *MMWR Morb Mortal Wkly Rep* 1998;47:733–737.
 - 66 Christoffel KK. Child and adolescent injury in the United States: how occupational injuries fit in. *Am J Ind Med* 1993;24:301–311.
 - 67 Suruda A, Philips P, Lillquist D, Sesek R. Fatal injuries to teenage construction workers in the US. *Am J Ind Med* 2003;44:510–514.
 - 68 West C, de Castro AB, Fitzgerald ST. The youth work force: unique occupational health considerations and challenges. *AAOHN J* 2005;53:297–305.
 - 69 Hard DL, Myers JR, Gerberich SG. Traumatic injuries in agriculture. *J Agric Saf Health* 2002;8:51–65.
 - 70 Perry MJ. Children's agricultural health: traumatic injuries and hazardous inorganic exposures. *J Rural Health* 2003;19:269–278.
 - 71 Hendricks KJ, Myers JR, Layne LA, Goldcamp EM. Household youth on minority operated farms in the United States, 2000: exposures to and injuries from work, horses, ATVs and tractors. *J Safety Res* 2005;36:149–157.
 - 72 Goldcamp EM, Hendricks KJ, Layne LA, Myers JR. Nonfatal injuries to household youth on racial minority-operated farms in the U.S., 2000. *J Agric Saf Health* 2006;12:315–324.
 - 73 Layne LA, Goldcamp EM, Myers JR, Hendricks KJ. Youth living on Hispanic-operated farms: injuries and population estimates in the U.S., 2000. *J Agric Saf Health* 2009;15:377–388.
 - 74 Chapman LJ, Taveira AD, Karsh BT, Josefsson KG, Newenhouse AC, Meyer RH. Work exposures, injuries, and musculoskeletal discomfort among children and adolescents in dairy farming. *J Agromedicine* 2009;14:9–21.
 - 75 Diggs BS, Lenfesty B, Arthur M, Hedges JR, Newgard CD, Mullins RJ. The incidence and burden of ladder, structure, and scaffolding falls. *Acad Emerg Med* 2005;12:267–270.
 - 76 D'Souza AL, Smith GA, Trifiletti LB. Ladder-related injuries treated in emergency departments in the United States, 1990–2005. *Am J Prev Med* 2007;32:413–418.
 - 77 McCarthy G. Nail gun injuries. *Ir Med J* 2002;95:156.
 - 78 Centers for Disease Control and Prevention (CDC). Nail-gun injuries treated in emergency departments—United States, 2001–2005. *MMWR Morb Mortal Wkly Rep* 2007;56:329–332.
 - 79 Van Dyke MW. Occupational medicine—where do we get the training? *Ann Emerg Med* 1987;16:1179.
 - 80 Imbrogno D. Education vital to emergency physician involvement. *Ann Emerg Med* 1987;16:1179–1180.
 - 81 Hege I, Radon K, Dugas M, Scharrer E, Nowak D. Web-based training in occupational medicine. *Int Arch Occup Environ Health* 2003;76:50–54.
 - 82 Butler RN. Work history is too often overlooked. *Geriatrics* 1991;46:17.
 - 83 Koskela RS, Kolari PJ, Järvinen E, Korhonen H. Completeness of occupational history and occurrences of work-related diseases. *Scand J Work Environ Health* 1984;10(6 Spec. No.):455–459.
 - 84 Liebman AK, Rowland M. To ask or not to ask: the critical role of the primary care provider in screening

- for occupational injuries and exposures. *J Public Health Manag Pract* 2009;15:173-175.
- 85 Suls ME. The importance of taking an occupational history. *Am Fam Physician* 2003;67:1684.
 - 86 Nicotera G, Nobile CG, Bianco A, Pavia M. Environmental history-taking in clinical practice: knowledge, attitudes, and practice of primary care physicians in Italy. *J Occup Environ Med* 2006;48:294-302.
 - 87 Politi BJ, Arena VC, Schwerha J, Sussman N. Occupational medical history taking: how are today's physicians doing? A cross-sectional investigation of the frequency of occupational history taking by physicians in a major US teaching center. *J Occup Environ Med* 2004;46:550-555.
 - 88 McDiarmid MA. Occupational exposure in lung cancer patients: contribution of remote past work. *Am J Prev Med* 1991;7:348-351.
 - 89 Hutton MD, Burnett CA. Occupation of cancer patients: a challenge to healthcare facilities. *J AHIMA* 1996;67:64-68.
 - 90 Nowak D, Ochmann U. [Work and cancer]. *MMW Fortschr Med* 2007;149(49-50):41-43.
 - 91 McCahy PJ, Harris CA, Neal DE. The accuracy of recording of occupational history in patients with bladder cancer. *Br J Urol* 1997;79:91-93.
 - 92 Seaton A. The hazards of asbestos. Detailed occupational history is vital. *BMJ* 1993;307:258.
 - 93 Gliniecki CM, Burell BJ. Temporary work restrictions: guidelines for the primary care provider. *Nurse Pract Forum* 1995;6:79-89.
 - 94 Mazanec DJ. The injured worker: assessing "return-to-work" status. *Cleve Clin J Med* 1996;63:166-171.
 - 95 Nadler S, Stitik T. Occupational low back pain: history and physical examination. *Occup Med* 1998;13:61-81.
 - 96 Peate WF. Work-related eye injuries and illnesses. *Am Fam Physician* 2007;75:1017-1022.
 - 97 Paul ME. Disorders of reproduction. *Prim Care* 1994;21:367-386.
 - 98 Frazier LM. Workplace reproductive problems. *Prim Care* 2000;27:1039-1056.
 - 99 Frazier LM, Jones TL. Managing patients with concerns about workplace reproductive hazards. *J Am Med Womens Assoc* 2000;55:80-83, 105.
 - 100 Sheiner EK, Sheiner E, Hammel RD, Potashnik G, Carel R. Effect of occupational exposures on male fertility: literature review. *Ind Health* 2003;41:55-62.
 - 101 Draper L. Working women and contraception: history, health, and choices. *AAOHN J* 2006;54:317-324; quiz 325-326.
 - 102 Genuis SJ. Health issues and the environment—an emerging paradigm for providers of obstetrical and gynaecological health care. *Hum Reprod* 2006;21:2201-2208.
 - 103 Campana A, de Agostini A, Bischof P, Tawfik E, Mastrorilli A. Evaluation of infertility. *Hum Reprod Update* 1995;1:586-606.
 - 104 Ebert F. Obtaining a relevant history for the assessment of worker dermatitis. *Occup Health Nurs* 1983;31:18-20.
 - 105 Blum J. Examination and interface with the musician. *Hand Clin* 2003;19:223-230.
 - 106 Sataloff RT. Efficient history taking in professional singers. *Laryngoscope* 1984;94:1111-1114.
 - 107 Sataloff RT. Clinical evaluation of the professional singer. *Ear Nose Throat J* 1987;66:267-277.
 - 108 Sataloff RT, Divi V, Heman-Ackah YD, Hawkshaw MJ. Medical history in voice professionals. *Otolaryngol Clin North Am* 2007;40:931-951, v.
 - 109 Li G, Lau JT, McCarthy ML, Schull MJ, Vermeulen M, Kelen GD. Emergency department utilization in the United States and Ontario, Canada. *Acad Emerg Med* 2007;14:582-584.
 - 110 Plomp HN. Employees' and occupational physicians' different perceptions of the work-relatedness of health problems: a critical point in an effective consultation process. *Occup Med (Lond)* 1993;43 (Suppl. 1):S18-S22.
 - 111 Tsukerman IM, Stezhkovi V, Borisiuk BN. [Experience with the use of questionnaires for detecting precancerous and tumorous diseases in railroad workers]. *Vopr Onkol* 1974;20:67-72.
 - 112 Solberg LL, Solberg JE. Questionnaire instructions—does anybody read them? *Fam Med* 1986;18:78-80.
 - 113 Is there a standardized questionnaire for obtaining an occupational history? *J Occup Environ Med* 1997;39:401.
 - 114 Booth-Jones AD, Lemasters GK, Succop P, Atterbury MR, Bhattacharya A. Reliability of questionnaire information measuring musculoskeletal symptoms and work histories. *Am Ind Hyg Assoc J* 1998;59:20-24.
 - 115 Hu H, Stern A, Rotnitzky A, Schlesinger L, Proctor S, Wolfe J. Development of a brief questionnaire for screening for multiple chemical sensitivity syndrome. *Toxicol Ind Health* 1999;15:582-588.
 - 116 Thompson JN, Brodtkin CA, Kyes K, Neighbor W, Evanoff B. Use of a questionnaire to improve occupational and environmental history taking in primary care physicians. *J Occup Environ Med* 2000;42:1188-1194.